ASSIGNMENT 7

Textbook Assignment: "Refrigeration," chapter 6, pages 6-1 through 6-22.

7-1. Refrigeration is defined as the process of

1. removing heat from a substance or area
2. replacing heat drawn from an substance
3. replacing cold drawn from an area or substance
4. producing cold in substance or area

7-2. Heat is a product of molecular motion that is known as kinetic energy.

1. True
2. False

7-3. What happens to molecular motion and the state of substance when enough heat is added to a substance?

1. The motion stops and the substance becomes a solid
2. The motion decreases and, if the substance was originally liquid, it becomes solid
3. The motion decreases and, if the substance was originally a gas, it becomes a liquid
4. The motion increases and the substance may change state

7-4. Molecular action in a substance is least when the substance is in what state?

1. Vapor
2. Liquid
3. Solid
4. Gas

7-5. When a person says a substance is "cold," what meaning is inferred?

1. It contains no heat
2. It cannot transfer heat
3. It is at absolute zero
4. It has less heat than a comparable warmer body

7-6. What characteristic of heat is shown by the speed of molecules within a substance?

1. Quality
2. Quantity
3. Intensity
4. Conductivity

7-7. When you have a pint of water in a container and a gallon of water in another and both are at the same temperature, what is required to raise the temperature of each container the same amount?

1. Different intensities of heat
2. Different temperatures of heat
3. Different qualities of heat
4. Different quantities of heat

7-8. A British thermal unit (Btu) is the amount of heat required to raise the temperature of 1 pound of water in any state 1°F at sea level.

1. True
2. False

7-9. A total of how many Btu is required to raise 5 pounds of water from 40°F to 165°F?

1. 125
2. 250
3. 625
4. 650

7-10. Which of the following formulas can be used to convert Fahrenheit to Celsius?

1. $C = \frac{(F - 32)}{18}$
2. $C = \frac{(F \times 1.8)}{18} + 32$
3. $C = \frac{(F + 32)}{18}$
4. $C = \frac{(F \times 1.8) - 32}{18}$

7-11. Convert 90° Celsius to degrees in Fahrenheit.

1. 180°F
2. 194°F
3. 212°F
4. 232°F

7-12. When you place an ice cube in a glass of water, what reaction develops almost immediately?

1. The ice melts because it is a solid
2. The water gets colder because it is a liquid
3. Heat is transferred from the water to the ice
4. Heat is given up by the ice to the water

7-13. What type of heat is equal to the number of Btu required to raise the temperature of 1 pound of any substance 1°F?

1. Sensible
2. Latent
3. Specific
4. Total

7-14. A total of how many Btu is required to raise the temperature of 1 pound of water 1^{o}?

1. 1
2. 2
3. 3
4. 4

7-15. A total of how many Btu is required to raise the temperature of 10 pounds of milk 1^{o}?

1. 6.00
2. 7.92
3. 8.29
4. 9.20

7-16. Sensible heat is heat added to or subtracted from a substance that changes its temperature but not its physical state.

1. True
2. False

7-17. What type of heat is absorbed or given off when the physical state of a substance is changing?

1. Latent
2. Specific
3. Effective
4. Sensible

7-18. Latent heat of fusion is the amount of heat required to change the state of a substance without affecting its temperature.

1. True
2. False

7-19. Total heat equates to the sum of what two types of heat?

1. Sensible and specific
2. Latent and sensible
3. Effective and latent
4. Sensible and effective

7-20. A day-ton of refrigeration is the amount of refrigeration produced by melting 1 ton of ice at 32°F in 24 hours.

1. True
2. False

7-21. What total number of Btu equals a day-ton of refrigeration?

1. 288,000
2. 144,000
3. 24,000
4. 12,000

7-22. An air conditioner rated at 24,000 Btu equals a total of how many day-tons?

1. 1
2. 1 1/2
3. 2
4. 2 1/2

7-23. Atmospheric pressure at sea level is

1. 17.4 psia
2. 15.7 psia
3. 14.7 psia
4. 13.5 psia

7-24. In refrigeration work, pressures above atmospheric pressure are measured in pounds per square inch. In what manner are pressures below atmospheric pressure measured?

1. Inches of water
2. Inches of vacuum
3. Inches of mercury
4. Inches of vapor

7-25. Refrigeration is made possible by altering the environment to allow what condition to occur?

1. Increased pressure on the makeup of a substance
2. Reduced pressure on the volume of a substance
3. Increased pressure on the volume of a substance
4. Reduced pressure on the boiling temperature of a substance

7-26. Vaporization is the process of changing a

1. liquid into a gas by increasing its pressure
2. gas into a liquid
3. liquid into a gas by adding latent heat of fusion
4. liquid into a gas by evaporization or boiling

7-27. What is meant by the term condensation?

1. To change vapor into a liquid
2. To change a liquid into a vapor
3. To change a solid into a liquid
4. To change a liquid into a solid

7-28. A refrigeration compressor increases the pressure on the gas and the condenser cools the gas. These two factors are critical to what refrigeration process?

1. Adding latent heat of fusion
2. Adding of latent heat of vaporization
3. Accelerating evaporation
4. Producing condensation

7-29. A refrigeration compressor withdraws the heat-laden refrigerant vapor from the evaporator and compresses the gas to a pressure that will liquefy in the condenser.

1. True
2. False

7-30. The crankshaft seal on a refrigeration compressor must prevent refrigerant and oil from leaking out and prevent air and moisture from entering the compressor.

1. True
2. False

7-31. What are the two types of compressor crankshaft seals?

1. Quad-ring and U-cup
2. O-ring and V-ring
3. Stationary bellows and rotating bellows
4. T-seal and flange packing

7-32. The term "hermetic" means airtight and refers to the

1. seal between the crankshaft and the crankcase
2. type of tubing connections used at the input and output of the compressor
3. case in which the motor and compressor are located
4. leakproofing of the bellows seal

7-33. The electrical motor and compressor of a hermetically sealed unit are sealed in the same case. By which of the following means are the motor and compressor cooled?

1. By water circulation
2. By oil circulation only
3. By the refrigerant vapor moving through the case only
4. By oil circulation and moving refrigerant through the case

7-34. Which of the following factors is not an advantage of a hermetically sealed compressor?

1. Elimination of a source of oil leaks
2. Elimination of pulleys
3. Elimination of coupling methods
4. Increased working capacity

7-35. Which of the following is not a type of condenser?

1. Air-cooled
2. Water-cooled
3. Evaporative
4. Pressurized

7-36. What type of condenser is used where low-quality water and its disposal make the use of circulating water-cooled types impractical?

1. Air-cooled
2. Evaporative
3. Pressurized
4. Constant pressure

7-37. What type of condensers uses several layers of small tubing formed into flat coils?

1. Water-cooled
2. Evaporative
3. Air-cooled
4. Constant pressure

7-38. What device is installed in the water boxes of water-cooled condensers to reduce electrolytic corrosion?

1. Anodes
2. Cathodes
3. Zinc wasting bars
4. Anticorrosion screens

7-39. The capacity of the water-cooled condenser will NOT be affected by which of the following factors?

1. Temperature of the water
2. Temperature of the refrigerant
3. Quality of the water
4. Quantity of the water

7-40. What is the function of the receiver?

1. To provide a reserve of gaseous refrigerant that is fed to the condenser as needed
2. To store liquid refrigerant available from the condenser during off-peak operation
3. To trap liquid refrigerant as it leaves the evaporator to prevent slugs of liquid refrigerant from entering the compressor
4. To trap oil that leaves the compressor and prevents it from entering the condenser or evaporator

7-41. What factor causes the refrigerant in the evaporator to boil?

1. The suction action of the compressor
2. The absorption of heat
3. The high-saturation action of the condenser
4. The conversion from a liquid state to a gaseous state

7-42. What are the two types of evaporators?

1. Dry and flooded
2. Wet and flooded
3. Dry and saturated
4. Dry and unsaturated

7-43. What type of evaporator uses the refrigerant in the evaporator to cool a secondary medium other than air?

1. Direct expanding
2. Indirect expanding
3. Forced-air
4. Natural convection

7-44. What is superheat?

1. The heat absorbed in the evaporator required to change the liquid to a gas
2. The difference in degrees between the saturation temperature and the increased temperature of the gas
3. The heat left in the liquid refrigerant as it leaves the expansion valve
4. The latent heat of vaporization

7-45. What is the purpose of the low-side float valve used with a flooded evaporator?

1. To control the flow of liquid refrigerant
2. To maintain a constant evaporator pressure
3. To increase the level of liquid refrigerant in the receiver
4. To ensure that only gaseous refrigerant enters the evaporator

7-46. The float valve of a high-side float expansion valve is located in the

1. liquid receiver
2. evaporator
3. capillary tube
4. compressor

7-47. What happens to refrigerant flow when the compressor shuts off in a system with capillary tubes?

1. The flow stops immediately
2. The flow continues until the remote bulb shuts off
3. The flow continues until the pressures in the evaporator and condenser are equal
4. The flow stops immediately if the evaporator is cool

7-48. In what location of a refrigeration system is a spring-loaded relief valve installed?

1. Between the compressor discharge connection and the discharge line stop valve
2. In the suction side of the compressor
3. Just beyond the compressor strainer
4. Next to the compressor shutoff valve

7-49. Solenoid stop valves are often used to control liquid flow to which of the following components?

1. Condenser
2. Receiver
3. Strainer
4. Expansion valve

7-50. What is the function of the dehydrator?

1. To offer resistance to the flow of the refrigerant
2. To change the gaseous refrigerant to a liquid
3. To remove compressor oil from the refrigerant
4. To remove moisture from the refrigerant

7-51. Bubbles appearing in the sight-flow indicator of a refrigeration system normally indicates the existence of what condition?

1. The proper amount of refrigerant gas is flowing to the evaporator
2. The proper amount of liquid refrigerant is flowing to the evaporator
3. The system is low on refrigerant
4. The dehydrator is not removing moisture from the system

7-52. A pressure regulator is installed between the outlet of the evaporator and the compressor to prevent

1. the evaporator pressure from being too high
2. the evaporator pressure from being too low
3. a restriction in the refrigerant flow when pressure is too low
4. a restriction in the suction line when pressure is too high

7-53. What is the function of the suction line filter-drier?

1. To remove dirt, scale, and moisture from the refrigerant after it leaves the compressor
2. To remove dirt, scale, and moisture from the refrigerant after it leaves the evaporator
3. To remove dirt, scale, and moisture from the refrigerant before it enters the compressor
4. To remove dirt, scale, and moisture from the refrigerant before it enters the evaporator

7-54. What is the function of the accumulator?

1. To trap oil out of the system
2. To provide a reservoir of liquid refrigerant for the thermostatic expansion valve
3. To prevent liquid from reaching the compressor suction inlet
4. To provide a reservoir of liquid refrigerant for the capillary tube

7-55. To prevent the accumulation of oil in various sections of the refrigeration system, you should install an oil separator between what two components?

1. Evaporator and compressor
2. Compressor and condenser
3. Condenser and receiver
4. Receiver and thermostatic expansion valve

7-56. Which of the following refrigerants is NOT considered a primary refrigerant?

1. Diclorodifluorohethane
2. Hydrofluorcarbon
3. Monchlorodifluoromethane
4. Refrigerant 502

7-57. A secondary refrigerant is cooled by

1. releasing its latent heat of vaporization into the space to be cooled
2. releasing its heat load to the primary refrigerant
3. expanding in an evaporator and vaporizing
4. being compressed and condensed in a refrigeration system

7-58. Refrigerants are classified into groups. Which of the following groups is considered the safest?

1. I
2. II
3. III
4. IV

7-59. What is the primary risk of R-12 to personnel?

1. Freezing effect it has on both skin and eyes
2. Poisonous fumes from the liquid waste it produces
3. Strong smell it produces
4. Tendency it has to decompose into deadly phosgene gas

7-60. The cylinder color code for R-502 is

1. silver
2. green
3. white
4. orchid

7-61. R-717 is commonly used in what systems?

1. Residential
2. Commercial
3. Industrial
4. Medical

7-62. Which of the following refrigerants is a blend component used in low- and medium-temperature applications?

1. R-125
2. R-134a
3. R-502
4. R-717

7-63. R-12 refrigerant that was used in automotive air conditioning is being replaced by which of the following refrigerants?

1. R-502
2. R-125
3. R-134a
4. R-114

7-64. When refrigerant contacts the eyes, rather then flood the eyes with water, your first step for first aid should be to irrigate the eyes with drops of a

1. weak boric acid solution
2. 2 percent saltwater solution
3. sterile mineral oil
4. weak solution of baking soda

7-65. You should take what action, if any, when refrigerant has been discharged from a cylinder?

1. Weight the cylinder and record the weight of the refrigerant remaining on the cylinder
2. Write the letters "MT" on the cylinder to designate that the cylinder is empty
3. Separate the cylinder from the full cylinders, so it can be used first
4. No action is required